SMART SOLUTIONS

Jürgen Keller, Schaeffler Group Industrial, and Thomas Schumacher, FAG Industrial Services, Germany, explain how the company's roller bearings and service solutions can help to reduce total costs.

Schaeffler Group Industrial has decades of experience relating to rolling bearings for plant and applications in the mining industry. Through the Smart Performance Program, the company is now providing more efficient support to its customers, to the same premium level of quality worldwide.

The company's Industrial Aftermarket unit offers, in partnership with its service subsidiary FAG Industrial Services (F'IS), a comprehensive portfolio of products and services in the field of roller bearings. In line with the principle of total cost of ownership (TCO), roller bearings and service solutions are presented that take account of the entire life cycle of machinery and plants. This is expressed in longer running times, shorter downtimes and thus lower total costs. Specially trained field service engineers provide onsite support anywhere in the world to customers on their particular area of concern.

The savings that can be achieved through the programme have been demonstrated in numerous applications in the mining industry.

FAG split spherical roller bearings reduce the time needed for maintenance of bucket wheel excavators.

Pilbara iron mine

At the Pilbara iron mine, Australia, the use of FAG split spherical roller bearings saved approximately € 27,500/bearing replaced. The replacement of bearings in the drives of bucket wheel excavators has always been associated until now with a great deal of work. Since access to the standard spherical roller bearings fitted was very difficult, mounting required about 72 hours. Schaeffler recommended the replacement of these spherical roller bearings by FAG split spherical roller bearings. The new bearings can be fitted in the existing housing without additional conversion measures. The mounting time is thus reduced by 50% and the downtimes are also significantly shorter as a result.

Despite the additional costs of a split spherical roller bearing, considerable savings could be achieved by using this solution. In addition, the customer benefited from reduced maintenance costs, since bearing replacement can be carried out more easily and quickly in future.

Split spherical roller bearings

Split spherical roller bearings are used principally where the replacement of standard spherical roller bearings requires additional outlay and time, the removal of gears or couplings, dismounting of drives or dismantling of shaft assemblies becomes necessary. The easy mounting thus shortens downtime of machinery and plant. Split spherical roller bearings are used on shafts with several support points and difficult to access mounting locations. Typical areas of application are conveying equipment, processing plant, ventilation equipment, rolling mills, ships and paper machinery. Split spherical roller bearings have a cylindrical bore; the inner ring, outer ring and the cage with the rollers are split into halves. The split bearing rings are held together with screws. The bearings have a split window made from brass (suitable for high temperatures) or glass fibre-reinforced polyamide. FAG spherical roller bearings are bearings for very heavy demands. They contain two rows of symmetrical barrel rollers as rolling elements that align themselves in the concave outer ring raceway without constraining forces. As a result, shaft deflections and misalignments are compensated.

Customer-specific designs

In order to fulfil complex, customer-specific tasks, the Industrial Aftermarket unit offers not only standard bearings but also special designs for the mining industry.

At Tenova Takraf, an international leader in mining technology and bulk handling, it was necessary to replace a bearing on the output shaft of a bucket wheel excavator without dismounting the gearbox, for reasons of time and cost. Schaeffler took up this challenge and worked in close partnership with the customer to develop a bearing specifically matched to this requirement. This bearing was based on a split FAG cylindrical roller bearing. For this particular customer, the bearing produced consists of a conventional two-piece outer ring and a roller and cage assembly. However, the inner ring is split at three points. The segments of the inner and outer rings are made from hardened rolling bearing steel.

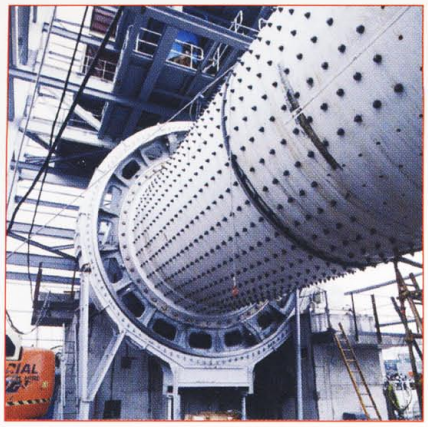
The partnership between Schaeffler and Tenova Takraf proceeded in close consultation right from the planning phase. Each dismounting and mounting stage was well prepared. Special tools were produced for removing the inner ring segments of the old bearing from the housing and for extracting the locking collar screws on the inner side of the bearing. These were tested in the workshop under simulated operating conditions.

The solution developed by Schaeffler meant that it was not necessary to completely dismount the gearbox and transport it to a workshop. Bearing replacement could be carried out onsite and within a planned, very short downtime. The work required and the costs were considerably reduced as a result.

Due to the close partnership and ongoing consultation between the service and maintenance division and the product development, the company supported its customer through innovative products and tailored services.

The importance of maintenance

In addition to high-quality products, maintenance is increasingly becoming



Online condition monitoring avoids unplanned downtimes of tube mills.

a decisive competitive factor. Capital-intensive production plants require secure availability, founded on very high plant quality and an intelligent life cycle service that leaves nothing to chance. In this respect, increasing importance is attached to condition-based maintenance by means of vibration monitoring. Through regular (offline) or continuous (online) inspection of machines, the risk of failure is reduced. Unplanned machine downtime and high maintenance costs can thus be reliably avoided. Necessary repair and maintenance work can be planned over the long-term without impairing production. Operational security is also increased since companies can be informed at any time about the wear condition of components in their plant and machinery.

F'IS offers customised monitoring solutions that contribute to increased plant availability and quality assurance and thus allow customers to make considerable cost savings. Companies that would like to adopt the concept of condition-oriented maintenance are supported by F'IS through initial training, mentoring during the introductory phase, expert backup and tailored service contracts.

At Spenner Zement, Erwitte, Germany, the use of an online vibration monitoring system on a tube mill (cement mill) made it possible to prevent an unplanned plant downtime and thus save costs of € 27,000. F'IS installed the online monitoring system FAG DTECT X1 with a total of five sensors on the gearbox and reduction gear. In addition, employees were prepared for independent data evaluation in a three month training course, allowing them to operate the system themselves. The investment in the monitoring system paid for itself as soon as damage was prevented to one gearbox. Since the monitoring system had detected tooth damage in the gearbox at an early stage, the gearbox was replaced during a planned downtime. Wear to the teeth of the reduction pinion was also detected and eliminated. Unplanned plant downtime and the resulting lost production were prevented through early defect detection.

In addition to vibration monitoring, the reconditioning of roller bearings offered by F'IS makes a decisive contribution to securing ongoing availability through shorter lead times. The portfolio is rounded off by a wide range of mounting and alignment tools, measuring instruments, lubricants and training courses. WC